

What is PK natural

PK natural

PK, polyketone

PK natural is an aliphatic polyketone – a semi-crystalline engineering thermoplastic that closes the gap between polyamide and POM. It combines exceptionally high toughness, retained even at low temperatures, with very good wear, chemical and hydrolysis resistance at low moisture absorption.

Properties

PK natural shows an elongation at break of more than 70 % and a notched impact strength of 12 kJ/m² – considerably tougher than POM – at a yield stress of 70 MPa and a continuous service temperature of 100 °C. In sliding contact, wear is lower than with POM and PA; moisture absorption of 0.4 % is far below that of polyamide, so dimensions and strength remain stable even in humid environments. The material is resistant to fuels, oils, solvents and many chemicals, and hydrolysis resistant against hot water.

With 1,700 MPa, the tensile modulus is lower than that of POM or PA 66, and the heat deflection temperature (HDT 83 °C) limits applications under high load at elevated temperature. Thermal expansion is comparatively high, and PK – like POM – is not resistant to strong acids and oxidising agents.

Advantages

- Very high toughness, even at low temperatures
- Very good wear resistance and sliding properties
- High chemical, fuel and hydrolysis resistance
- Low moisture absorption (0.4 %)

Disadvantages

- Lower stiffness than POM and PA 66
- Limited heat deflection temperature (HDT 83 °C)
- High thermal expansion, not resistant to strong acids

Processing

PK natural is one of the easiest engineering plastics to machine: sawing, turning, milling, drilling and thread cutting are straightforward with standard HSS or carbide tools, chips break short and surfaces come out clean. Good cooling via chip removal avoids heat build-up.

For tight tolerances and thick-walled parts, we recommend intermediate annealing to relieve machining stresses; the low moisture absorption makes conditioning unnecessary.

Because of the high toughness, chips tend to flow; sharp tools with a large rake angle and good chip removal ensure clean surfaces.

Typical Applications

PK natural is used wherever components are exposed to high impact loads, wear and aggressive media – for example in the oil and gas industry, in mechanical engineering and in the automotive industry.

- Gears, sliding and guide elements under high impact load
- Components in contact with fuels, oils and chemicals
- Wear parts in conveyor and packaging systems

Typical Properties

- Very high toughness even at low temperatures
- High chemical and hydrolysis resistance
- Very good wear resistance

Product Examples

- Gears and sliding elements
- Media-carrying components
- Wear parts

Typical Industries

- Oil and Gas Industry
- Mechanical Engineering
- Automotive Industry

- Low moisture absorption

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.25
Water absorption	DIN EN ISO 62	%	0.40
Flammability (Thickness 3 mm / 6 mm)	UL 94		HB / HB
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	70
Elongation at break	DIN EN ISO 527	%	>70
Tensile modulus of elasticity	DIN EN ISO 527	MPa	1.700
Notched impact strength	DIN EN ISO 179	kJ / m ²	12.0
Shore hardness	DIN EN ISO 868	scale D	78
Thermal Properties			
Melting temperature	ISO 11357-3	°C	225
Coefficient of linear thermal expansion	DIN 53752	10 ⁻⁶ / K	110
Service temperature, long term	Average	°C	-30 ... 100
Service temperature, short term (max.)	Average	°C	150
Heat deflection temperature	DIN EN ISO 75, Verf. A, HDT	°C	83
Electrical Properties			
Surface resistivity	DIN EN 62631-3-2	Ω	10 ¹³